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PILOTING AN INSTRUMENT TO DETERMINE THE ROLE OF ENDORSER'S CREDIBILITY AND IDENTIFICATION IN ADVERTISEMENTS: ANALYSING THE MODERATING EFFECT OF CELEBRITY VERSUS SOCIAL MEDIA INFLUENCER

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ABSTRACT

The aim of this research was to perform instrument validation and reliability through exploratory factor analysis (EFA). The questionnaire items were adapted from different established studies. The questionnaire consisted of 10 variables. Following subject-to-variable ratio of 10:1, a sample of 100 was determined. Data was collected online from four universities across Pakistan – one each from Peshawar, Islamabad, Lahore and Karachi. Validity was assessed using EFA with Promax rotation, which successfully extracted 10 factors. Pattern Matrix after rotation also confirmed the 10-factor structure. All factor loadings were greater than 0.5. Component Correlation Matrix also confirmed distinctness of components and their theorized correlations. Reliability was assessed by computing Cronbach Alpha. Alpha values exceeded 0.7 for all the constructs confirming the internal consistency of items. This study formulated a valid and reliable instrument capable of capturing the complex interplay between endorsers' attributes, consumer attitudes, and purchase intentions in today's multifaceted advertising landscape.

Keywords: *Instrument; Piloting; Endorser Credibility; Identification; Social Media Influencers; Celebrity Endorsement; Attitude towards Advertisement; Attitude towards Brand; Purchase Intentions;*

INTRODUCTION

In the dynamic landscape of marketing and advertising, understanding the factors that influence consumer behaviour is crucial for brands seeking to connect with their target audiences. Among these factors, the credibility of endorsers and the degree to which consumers identify with them play a significant role in shaping attitudes and, ultimately, purchase intentions. With the rise of social media, the traditional celebrity endorser model is being challenged by social media influencers who, despite their more relatable personas, may exert significant influence over consumer decisions.

This study addresses the critical need for a robust, valid, and reliable instrument to measure how endorser credibility and identification affect customers' purchase intentions. It investigates the purchase intentions shaped by customers' attitude towards advertisement and brand while also exploring the moderating effect of the type of endorser—celebrity versus social media influencer on the relationship between attitudes and purchase intentions. Conducted within the context of an emerging market, this research contributes to the growing body of literature by providing a tailored instrument that captures the nuances of consumer response in a culturally specific environment.

The formation of this instrument involved a careful process of adaptation and validation, incorporating established scales from the literature while refining them to ensure cultural and contextual applicability. The resulting tool offers a comprehensive measure that can be used by researchers and practitioners alike to better understand the complex interplay between endorsers, consumer attitudes, and purchase intentions in today's multifaceted advertising ecosystem.

Following sections detail the process of instrument development including item selection, exploratory factor analysis, and reliability testing, to demonstrate the robustness of the scale and its suitability for capturing the intricate dynamics at play in modern consumer behaviour.

Objective:

The aim of this study is to test the reliability and validity of an instrument measuring the role of endorser's Credibility and Identification in advertisements by analysing the moderating effect of Celebrity versus Social Media Influencer on the mediating relationship of attitude towards advertisement and brand with purchase intentions of a customer.

Methodology:

Research Design

This study used a survey-based research strategy in order to evaluate the validity and reliability of an instrument. An online survey was used to gather data, giving researchers easy access to a large and convenient sample of the target population.

Sample and Sampling Technique

Based on Nunnally's (1978) rule of thumb, which recommends a participant-to-item ratio of 10:1, the pilot study comprised 100 responders. Four major Pakistani cities were included in the sample: Islamabad, Lahore, Karachi, and Peshawar. Twenty-five respondents were assigned to each city. The majority of the responders were college students who were chosen based on their accessibility. For the sake of accessibility, similar studies have also used university students (Aw & Labrecque, 2020; Djafarova & Rushworth, 2017; Ohanian, 1990; Schouten et al., 2020).

Non-probability Purposive sampling technique was employed in order to sample the data. As per the inclusion-exclusion criteria, people from both the genders i.e. male and female falling within the age group of 17- 40 years and who used social media were included in this study. According to Jamil & Hassan (2014), the reason for selecting this age group is because, it has a keen interest about what is being offered in an advertisement and by whom it is endorsed; and they are usually the most targeted potential customers for the products offered by the brands.

Instrument Development

This study employed a questionnaire technique to measure the collected data. The appropriate definitions of the variables were provided with the questions to ensure comprehension. The questionnaire was designed using a five-point Likert scale, with 1 denoting "Strongly Disagree" to 5 denoting "Strongly Agree". The basic aim of Likert scale is to study the respondent's preferences about a given situation or statement or to know the level of agreement or disagreement with a given situation (Victor L. 2007). Hence, this scale was chosen for its simplicity and effectiveness in capturing participants' perceptions and attitudes across the various constructs measured.

The instrument was structured into several sections, each focusing on a different construct, as detailed below. To ensure the relevance of responses, filter questions regarding participants' social media usage and their following of social media influencers or celebrities were included in the beginning of questionnaire. These questions were adapted from Lou & Yuan (2019).

Credibility:

Credibility is defined as the extent to which a source (such as a person, organization, or message) is perceived as trustworthy and competent, influencing the acceptance of the information provided (Hovland et al., 1953). Ohanian (1990) developed a widely recognized scale to measure endorser credibility, which is composed of three primary dimensions: expertise, trustworthiness,

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and attractiveness. Expertise is defined as the extent to which a communicator is perceived to be a source of valid assertions (Hovland et al., 1953); trustworthiness in communication is the listener's degree of confidence in, and level of acceptance of, the speaker and the message whereas, attractiveness refers to the physical appeal, likability, and overall charm of the endorser, which can enhance their perceived credibility and influence on consumers (Ohanian, 1990).

Hence, credibility was measured using credibility scale constructed by Ohanian (1990). The original scale is a semantic differential scale consisting of bipolar adjectives. In total 15 questions/items were formed by paraphrasing these adjectives retaining the original concept. Five items were formed for each dimension as follows:

Credibility	
Expertise (Ohanian, 1990)	1. Expertise of an endorser I follow, influences my purchase decision for a certain product/service.
	2. Knowledge of an endorser I follow, influences my purchase decision for a product/service.
	3. Skill of an endorser I follow, influences my purchase decision for a product/service.
	4. Qualification of an endorser I follow, influences my purchase decision for a product/service.
	5. Experience of an endorser I follow, influences my purchase decision for a product/service.
Trustworthiness (Ohanian, 1990)	1. Trustworthiness of an endorser I follow, influences my purchase decision for a product/service.
	2. Honesty of an endorser I follow, influences my purchase decision for a product/service.
	3. Reliability of an endorser I follow, influences my purchase decision for a product/service.
	4. Dependability of an endorser I follow, influences my purchase decision for a product/service.
	5. Sincerity of an endorser I follow, influences my purchase decision for a product/service.
Attractiveness (Ohanian, 1990)	1. Attractiveness of an endorser I follow, influences my purchase decision for a product/service.
	2. Classiness of an endorser I follow, influences my purchase decision for a product/service.
	3. Beauty of an endorser I follow, influences my purchase decision for a product/service.
	4. Elegance of an endorser I follow, influences my purchase decision for a product/service.
	5. Sensuality of an endorser I follow, influences my purchase decision for a product/service.

Identification

Basing on the work of Hoffner & Buchanan (2005), according to Schouten et al., (2020), identification derives from both actual and perceived similarity – the degree to which one perceives to have things in common with another person, as well as wishful identification – the desire to be like the other person. Hence, identification was measured through its sub-dimensions i.e., perceived similarity and wishful identification. Three items for "perceived similarity" were adapted and modified from Adnan (2017) and McGuire (1985) whereas, three items for "wishful identification" were adapted from Hoffner & Buchanan (2005). The scale is as follows:

Identification	
Perceived Similarity (Adnan, 2017; cf. McGuire, 1985)	1. Similarity with an endorser's lifestyle/situation influences my purchase decision towards a product/service
	2. Resemblance with an endorser influences my purchase decision for a product/service
	3. Commonality with an endorser influences my purchase decision for a product/service
Wishful Identification (Hoffner & Buchanan, 2005)	1. Wishful Identification with and endorser I follow, influences my purchase decision for a product/service
	2. Desire to be like an endorser I follow, influences my purchase decision for a product/service
	3. Wish to emulate like an endorser I follow, influences my purchase decision for a product/service

Attitude Towards Advertisement: Attitude towards advertisement is defined as "a predisposition to respond in a favorable or unfavorable manner to a particular advertising stimulus during a particular exposure occasion (Lutz, 1985)." Five items related to participants' attitudes towards the advertisements were adapted from Schouten et al. (2020) who originally adapted the scale from Spears & Singh (2004). These questions aimed to capture the participants' overall evaluation of the advertisement's appeal and effectiveness. The items are as follows i.e.,

Attitude Towards Advertisement (Schouten et al., 2020; cf. Spears & Singh, 2004)	An advertisement endorsed by a famous endorser:
	1. Is likeable
	2. Reaches out to me
	3. Is exciting
	4. Appeals me
	5. Is good

Attitude Towards Brand: The attitude towards brand relates to the opinions that customers have about a brand (Suh & Youjae, 2006). Attitude towards the brand was measured using items adapted from Kruger et al. (2013). There were five items which assessed participants' general feelings and perceptions about the brand being endorsed.

Attitude Towards Brand (Kruger et al., 2013)	My attitude towards a brand endorsed by a famous endorser:
	1. I am attracted to the brand
	2. I feel confident in that brand
	3. Brand will not disappoint me
	4. Brand guarantees satisfaction
	5. I desire that brand

Purchase Intentions: Purchase intentions is the likelihood of a consumer to buy the product or service of a company after certain evaluation (Younus et al., 2015). Purchase intentions were measured using three items adapted from Spears & Singh (2004). These items were designed to gauge the likelihood of participants purchasing the product endorsed by the celebrity or influencer.

Purchase Intentions (Spears & Singh, 2004)	1. I am likely to purchase a product/service endorsed by famous endorsers.
	2. I intend to buy a product/service advertised by famous endorsers.
	3. I will definitely buy a product/service endorsed by famous endorsers.

Endorser Type: To distinguish between the perception of respondents w.r.t endorser type i.e., celebrity vs. social media influencer endorser, five items for celebrity endorser were adopted from O'Mahony & Meenaghan (1997) Khan (2017). These questions were modified to measure the effect of social media influencer accordingly.

Endorser Type	
Celebrity (Khan, 2017; O'Mahony & Meenaghan, 1997)	1. Celebrity endorsement is an important factor when I make a purchase decision.
	2. I will switch from one product/service to another if it is advertised by my favourite celebrity.
	3. If a product/service is endorsed by a celebrity whom I dislike, this might change my consumer interest in product.
	4. As compared to social media influencer, a celebrity grabs your attention more easily.
	5. The presence of a celebrity in an advertisement helps me recognize and recall a product/service easily.
Social Media Influencer	1. Social media influencer endorsement is an important factor when I make a purchase decision.
	2. I will switch from one product/service to another if it is advertised by my favorite social media influencer.
	3. If a product/service is endorsed by a social media influencer whom I dislike, this might change my consumer interest in product.
	4. As compared to celebrity endorsement, a social media influencer grabs your attention more easily.
	5. The presence of a social media influencer in an advertisement helps me recognize and recall a product/service easily.

Data Analysis
Data was collected using an online survey distributed via Google Forms. The survey was shared on the official Facebook pages of one university each from Islamabad, Lahore, Karachi, and Peshawar. The decision to use online data collection was driven by the convenience and efficiency it offers, especially in reaching a dispersed and tech-savvy population.

In order to statistically validate the reliability and validity of instrument, Exploratory Factor Analysis was carried out utilizing IBM SPSS Statistics version 22.0.

Results

Exploratory Factor Analysis (EFA)

EFA is a statistical method that is used to reduce relatively large sets of study variables (observed variables or items) into small number of factors or latent variables (Latif, 2022). However, due to explorative nature of factor analysis, it does not differentiate between independent and dependent variables. In more elaborate terms, EFA is conducted to see if the items in a survey instrument have similar patterns of responses and do they hang together to create a latent construct. There are three major steps for conducting EFA (Shrestha, 2021) namely: 1) assessment of suitability of the data, 2) factor extraction 3) rotation and interpretation.

1. Assessment of the Suitability of Data

For the assessment of the suitability of data set, Sample size, Correlation Matrix, Kaiser-Meyer-Olkin (KMO) and Bartlett's test for Sphericity have to be determined in order to check the suitability of data for EFA (Shrestha, 2021).

a) Sample Size Determination

According to Costello & Osborne (2005), In a majority of the studies researchers performed analyses with subject to item ratios of 10:1 or less, which is an early and still-prevalent rule-of-thumb many researchers use for determining *a priori* sample size. Since, this study had 10 main variables in total, following the subject-to-item ratio, a sample of 100 was concluded.

b) Correlation matrix

To determine the suitability of data set for EFA, correlations among items/variables are observed for running EFA. According to Hair et al. (2010), the correlations among items should be >0.3 to warrant EFA. The correlation among most of the items was more than 0.3 which guaranteed the furthering of EFA. In other words, loading of 0.3, indicates that the factors account for approximately 30% relationship within the data.

c) Kaiser-Meyer-Olkin and Bartlett's Test of Sphericity

Kaiser-Meyer-Olkin (KMO) test measures sampling adequacy for each variable in the model and for the complete model. KMO value varies from 0 to 1 where a value less than 0.6 indicate that sampling is not adequate and the remedial action is required (Kaiser, 1970; Shrestha, 2021). As for this data, the test computed KMO statistics at 0.69 which rendered the sample data suitable for the factor analysis.

The Bartlett's test of Sphericity is used to test the null hypothesis that the correlation matrix is an identity matrix. An identity correlation matrix means your variables are unrelated and not ideal for factor analysis (Bartlett, 1950). As for this study, Bartlett's test of Sphericity was highly significant at $p < 0.00$ which is less than $p < 0.05$ (Bartlett, 1950). The test value shows that the correlation matrix had significant correlations among some of the variables. It also verifies that correlation matrix is not identity matrix (Bartlett, 1950; Shrestha, 2021). Hence, the hypothesis that the correlation matrix is an identity matrix is rejected. Following table (1) illustrates the statistics for KMO and Bartlett's test of Sphericity.

Table (1) KMO and Bartlett's Test of Sphericity

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.694
Bartlett's Test of Sphericity	Approx. Chi-Square	2762.851
	df	703
	Sig.	.000

Note: Above values of KMO and Bartlet's test of Sphericity were taken after the second PCA that was run after adjustments to Pattern Matrix. The reason for this is that the adjustments to the items can change the overall factor structure, affecting the sampling adequacy and the correlation matrix (Tabachnick et al., 2013).

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2. Factor Extraction

Factor extraction determines the least number of factors that best represent the interrelationship among the group of items (Shrestha, 2021). For factor extraction, Principal Component Analysis (PCA) was selected which is also the default method in any statistical program (Thompson, 2004) - a most commonly used method that is also easy to interpret (Hair et al., 2013). In order to determine the number of factors to be extracted, many techniques are used such as Kaiser's criterion or Eigenvalue criterion (Kaiser, 1960), Scree test (Cattell, 1966), the Cumulative Variance Extracted and Parallel analysis (Horn, 1965). However, no single criteria should be assumed to determine factor extraction (Costello & Osborne, 2005a). The literature suggests multiple approaches be used in factor extraction (Hair et al., 1995). Therefore, keeping in accordance with the literature, this study has used three techniques: The Kaiser's Criterion, Cumulative variance Extracted and the Scree test for factor extraction.

a) Kaiser's Criterion (Eigenvalue) and Cumulative Percentage of Variance

In order to run the factor extraction, we followed the general procedure of conducting Principal Component Analysis (IBM, 2022). The Eigenvalue or Kaiser criterion of a component decided the number of factors/components to be retained. The rule suggests to retain the factors whose eigenvalues are greater than 1 (Kaiser, 1974). Factors are actually the latent constructs created as aggregates of observed variables/items. Each factor, determined by Kaiser criterion, represents an amount of variance explained by it. Their cumulative percentage explains the total variance in a given set of data (Kaiser, 1960).

For the extraction, all the 44 items were taken into account for the analysis. The analysis was run. PCA extracted 11 factors with eigenvalues > 1. However, this exceeded the theoretically expected 10 factor structure based on our literature review. In order to address this issue, initially communalities were analyzed. According to Hair et al. (2013), communalities represent the proportion of each item's/variable's variance that is explained by the extracted factors in factor analysis. The closer the communality is to 1, the better the variable/item is explained by the factor structure. Our analysis yielded high communalities for all the items ranging from 0.57 to 0.92 except for EXPRT3 which had moderately low at 0.47 but acceptable (Hair et al., 2013). Next remedial action was to analyze pattern matrix. According to Osborne & Banjanovic (2016) EFA is an iterative process - Following the first extraction, the pattern matrix is inspected, and any problematic items are examined and possibly eliminated - This iterative process leads to a factor structure that is more theoretically sound and cohesive (Osborne & Banjanovic, 2016). Given the justification, the pattern matrix was reviewed. As a result, in total four problematic items were deleted (see annexure). Hence, the extraction was re-run which reproduced the expected 10-factor structure with eigen values > 1. In other words, 40 items measured 10 underlying factors (see annexure). Other factors/components having low eigenvalues were not assumed to represent the data set and were dropped. All these factors accounted for more than 75.96% variance in data. It is massive because, the proportion of the total variance explained by retained factors should be at least 50% (Shrestha, 2021). Below is the table (2) showing components extracted, their eigenvalues and cumulative variances:

Table (2) Components Extracted, their Eigenvalues and Total Variances

Component	Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %
1	7.626	20.067	20.067
2	3.901	10.267	30.334
3	3.306	8.701	39.035
4	2.937	7.728	46.763
5	2.677	7.044	53.807

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6	2.153	5.665	59.472
7	1.927	5.072	64.544
8	1.740	4.579	69.122
9	1.441	3.791	72.914
10	1.161	3.056	75.969

Nevertheless, eigenvalues, like all other sample statistics are prone to sampling error therefore, another common method is the Scree test (Cattell, 1966).

b) **Scree Test**

Cattell (1996) proposed a graphical test for determining the number of factors. This test involves examining the graph of eigenvalues and looking for the natural bend or breakpoint in the data (Scree) where the curve flattens out. The number of datapoints above the "break" or "cut-off" are the number of factors or components to be retained (Cattell, 1966). The number of principal components to retained are then subjectively determined by locating the point at which the graph shows a distinct change in the slope (Cattell, 1966).

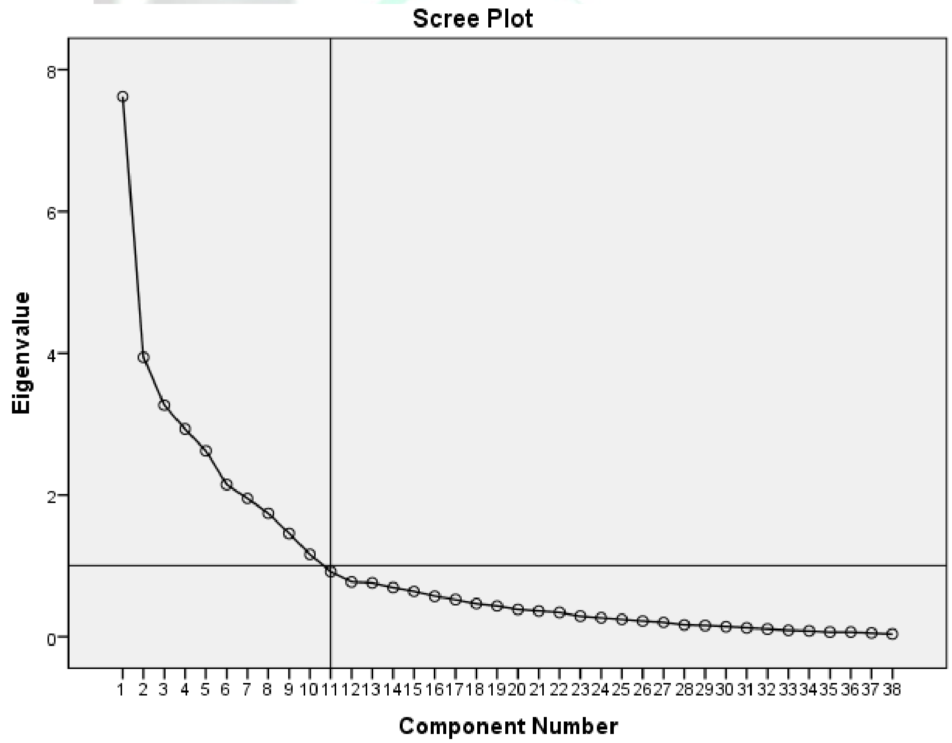

Figure (1) Scree Plot

In Figure (1) above, the inspection of scree plot revealed a 10-factor result because the bent/breakpoint occurred at 11th factor where eigenvalue drops from 1. The other factors having eigen values < 1 were not considered because they accounted for a small proportion of the variance consequently dropped from the analysis.

3) Factor Rotation and Interpretation

Rotation ensues extraction to improve the interpretability of the factor structure. The goal of rotation is to simplify the data structure (Costello & Osborne, 2005a). There are two main approaches to factor rotation: orthogonal or oblique and researchers have several methods to choose from any of one of the rotation options (Williams et al., 2010). Orthogonal rotations produce factors that are uncorrelated whereas Oblique rotations allow factors to be correlated. According to Costello & Osborne (2005), although, orthogonal rotation produces results that are easily interpretable as compared to oblique rotations which is slightly complex nevertheless its results are more accurate. Tabachnick et al., (2007) argues that "Perhaps the best way to decide between orthogonal and oblique rotation is to request oblique rotation from SPSS with desired numbers of factors. Then look at the factor correlation matrix (component correlation matrix) for correlations, if correlations exceed absolute value of 0.32, then there is 10% or more overlap in variance among factors, enough variance to permit oblique rotation. For oblique rotation, Costello & Osborne (2005) recommend analyzing Pattern Matrix (examined for factor-item loadings) and Component Correlation Matrix (examined for correlation between the factors) unlike orthogonal rotation where Rotated Factor Matrix is analyzed only.

Hence, rotation was initiated through Oblique rotation using Promax rotation method. According to Costello & Osborne (2005) there is no widely preferred method of oblique rotation; all tend to produce similar results, and it is acceptable to use the default delta (0) or kappa (4) values in the software packages. Manipulating delta or kappa changes the amount the rotation procedure "allows" the factors to correlate, and this appears to introduce unnecessary complexity for interpretation of results.

a) Pattern Matrix

Pattern Matrix indicates how much each observed variable contributes to each factor. The pattern matrix isolates the effect of each variable on a specific factor, independent of its relationship with other factors. This means that if a variable strongly contributes to a factor, the pattern matrix will show a high loading value for that variable on that particular factor, excluding any shared influence with other factors (Tabachnick et al., 2013).

After running the rotation, at first the component correlation matrix. Most of the factors/components had correlations >.32 which reinforced the argument of using Oblique rotation (Tabachnick et al., 2013) in our study. Pattern matrix loadings showed all the items strongly loaded on to their respective factors with some exceptions. Since, EFA is an iterative process i.e. the factor structure frequently has to be reviewed and improved - The pattern matrix is inspected, and any problematic items are examined and possibly eliminated. This iterative process leads to a factor structure that is more theoretically sound and cohesive (Osborne & Banjanovic, 2016). After analyzing the pattern matrix, remedial actions were taken. It was observed that EXPERT 3 (Qualification of an endorser I follow, influences my purchase decision for a product/service), ATA4 (An advertisement endorsed by a famous endorser: is good), CELEB2 (I may switch from one product/service to another if it is advertised by my favourite celebrity) and SMI2 (I may switch from one product/service to another if it is advertised by my favourite social media influencer) were forming a new factor. The content of the items was re-examined. And the items were deleted. Table (3) below displays output of rotation. Item codes should be referred to as: *TRUST=Trustworthiness, ATB=Attitude Towards Brand, ATTRACT=Attractiveness, ATA=Attitude Towards Advertisement, CELEB=Celebrity, EXPRT=Expertise, SMI=Social Media Influencer, WIDEN=Wishful Identification, PSIM=Perceived Similarity, PI=Purchase Intentions.*

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Table (3) Pattern Matrix: Factor Loadings of Items on Factors

Pattern Matrix											
Item Code	**Items Description**	**Components**									
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
CELEB3	If a product/service is endorsed by a celebrity whom I dislike, this might change my interest in that product	**.94**									
CELEB5	The presence of a celebrity in an advertisement helps me recognize and recall a product/service easily	**.94**									
CELEB1	Celebrity endorsement is an important factor when I make a purchase decision	**.93**									
CELEB4	As compared to a social media influencer, a celebrity grabs your attention more easily	**.91**									
TRUST2	Honesty of an endorser I follow, influences my purchase decision for a product/service.		**.94**								
TRUST5	Sincerity of an endorser I follow, influences my purchase decision for a product/service.		**.86**								
TRUST3	Reliability of an endorser I follow, influences my purchase decision for a product/service.		**.85**								
TRUST1	Trustworthiness of an endorser I follow, influences my purchase decision for a product/service.		**.76**								
TRUST4	Dependability of an endorser I follow, influences my purchase decision for a product/service.		**.67**								
ATB2	My attitude towards a brand endorsed by a famous endorser: I feel confident in that brand.			**.83**							
ATB5	My attitude towards a brand endorsed by a famous endorser: I desire that brand.			**.81**							
ATB3	My attitude towards a brand endorsed by a famous endorser: Brand will not disappoint me.			**.81**							
ATB4	My attitude towards a brand endorsed by a famous endorser: That brand guarantees satisfaction.			**.80**							
ATB1	My attitude towards a brand endorsed by a famous endorser: I am attracted to that brand.			**.79**							

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ATTRACT 4	Elegance of an endorser I follow, influences my purchase decision for a product/service.				**.92**						
ATTRACT 5	Sensuality of an endorser I follow, influences my purchase decision for a product/service.				**.91**						
ATTRACT 3	Beauty of an endorser I follow, influences my purchase decision for a product/service.				**.88**						
ATTRACT 1	Attractiveness of an endorser I follow, influences my purchase decision for a product/service.				**.64**						
ATTRACT 2	Classiness of an endorser I follow, influences my purchase decision for a product/service.				**.54**						
SMI5	The presence of a social media influencer helps me recognize and recall a product/service easily					**.98**					
SMI1	Social media influencer endorsement is an important factor when I make a purchase decision					**.98**					
SMI4	As compared to a celebrity, a social media influencer grabs your attention more easily					**.86**					
SMI3	If a product/service is endorsed by a social media influencer whom I dislike, this might change my interest in that product					**.61**					
ATA1	An advertisement endorsed by a famous endorser: Is likeable						**.99**				
ATA3	An advertisement endorsed by a famous endorser: Is exciting						**.96**				
ATA5	An advertisement endorsed by a famous endorser: Appeals me						**.95**				
ATA2	An advertisement endorsed by a famous endorser: Reaches out to me						**.53**				
EXPRT2	Knowledge of an endorser I follow, influences my purchase decision for a product/service.							**.85**			
EXPRT1	Expertise of an endorser I follow, influences my purchase decision for a certain product/service.							**.84**			
EXPRT4	Skill of an endorser I follow, influences my purchase decision for a product/service.							**.79**			

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EXPRT5	Experience of an endorser I follow, influences my purchase decision for a product/service.							**.72**			
PSIMI2	Commonality with an endorser influences my purchase decision for a product/service.								**.90**		
PSIMI3	Resemblance with an endorser influences my purchase decision for a product/service.								**.88**		
PSIMI1	Similarity with an endorser's lifestyle influences my purchase decision for a product/service.								**.81**		
WIDEN3	Wish to behave like an endorser I follow, influences my purchase decision for a product/service.									**.91**	
WIDEN2	Desire to be like an endorser I follow, influences my purchase decision for a product/service.									**.89**	
WIDEN1	Wishful Identification with an endorser I follow, influences my purchase decision for a product/service.									**.78**	
PI3	I will definitely buy a product/service endorsed by famous endorsers.										**.81**
PI1	I am likely to purchase products/services endorsed by famous endorsers.										**.76**
PI2	I intend to buy products/services advertised famous endorsers in the future.										**.73**

Extraction Method: Principal Component Analysis.
Rotation Method: Promax with Kaiser Normalization
Rotation converged in 6 iterations.

b) Component Correlation Matrix

A component correlation matrix is a square matrix that shows the correlations between different components (or factors) extracted during principal component analysis (PCA) when using an oblique rotation method like Promax. The values in the matrix range from -1 to +1. Stronger correlations indicate that components are more closely related whereas, values closer to 0 suggest weaker relationships between components (Hair et al., 2013; Tabachnick et al., 2013). This matrix is especially important when factors are allowed to correlate, as it helps in understanding the overall structure and relationships within the data (Hair et al., 2013). Below is the table (4) showing components correlation among each other:

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Table (4) Component Correlation Matrix

Component Correlation Matrix										
Component	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
1	1	0.38	0.58	0.36	0.12	0.6	0.14	0.06	0.06	0.25
2	0.38	1	0.34	0.35	0.24	0.33	0.31	0.35	0.34	0.37
3	0.58	0.34	1	0.39	0.13	0.59	0.15	0.08	0.07	0.3
4	0.36	0.35	0.39	1	0.27	0.37	0.23	0.33	0.32	0.38
5	0.12	0.24	0.13	0.27	1	0.13	0.52	0.06	0.04	0.28
6	0.6	0.33	0.59	0.37	0.13	1	0.15	0.07	0.06	0.27
7	0.14	0.31	0.15	0.23	0.52	0.15	1	0.04	0.05	0.38
8	0.06	0.35	0.08	0.33	0.06	0.07	0.04	1	0.55	0.37
9	0.06	0.34	0.07	0.32	0.04	0.06	0.05	0.55	1	0.39
10	0.25	0.37	0.3	0.38	0.28	0.27	0.38	0.37	0.39	1

Component 1=TRUST, Component 2=ATB, Component 3=ATTRACT, Component 4=ATA, Component 5=CELEB, Component 6=EXPRT, Component 7=SMI, Component 8=WIDEN, Component 9=PSIMI, Component 10=PI

The matrix showed moderately strong to weak positive correlations among all the components. The strongest correlation existed between Component 1, 3, and 6 with correlations ranging from 0.58 to 0.60. This clustering of components indicated a large amount of variance shared with each other suggestive of forming a potential higher-order construct of Credibility. Another strongest correlation existed between Component 8 and Component 9 at 0.55 followed by the components 5 and component 7 at 0.52, also indicating a possible higher-order construct associated to Identification and Endorser Type. In contrast, weakest correlations (0.04 to 0.08) exhibited between the clusters (components 1,3,6 and components 8 and 9) highlighting negligible interaction between these components.

The group of components (1, 3, 6) showed moderate positive correlations with both component 2 and component 4. The correlations range from 0.36 to 0.41, which indicated a consistent, moderate relationship. The group of components (8, 9) showed slightly weaker, but still positive correlations with both component 2 and 4. These correlations range from 0.30 to 0.33, indicating a weak to moderate relationship. Whereas, the group (2 and 4) also showed consistent moderate correlations with component 10 mostly within the 0.3-0.4 range.

Over all, the matrix displayed a complex interplay of components with some clear clusters emerging. The generally positive correlations indicated that most components tend to move in the same direction.

4. Reliability

Once EFA has identified the factor structure (i.e., the number of factors and the items that load onto each factor), it is required to calculate Cronbach's alpha/reliability for each factor. Reliability test is performed to check internal consistency of the items for each variable (Santos, 1999) since it is one of the most reliable indicators of measuring internal consistency of the scale items (Safi, 2018). *Table (5)* below, displays the alpha scores for all the constructs ranging from 0.7 to 0.8. Credibility scored the highest 0.84 followed by Attitude towards brand 0.81 whereas, endorser type scoring the lowest 0.75. The values between 0.7 or higher are generally acceptable for exploratory research in marketing field (Malhotra, 2020).

Variable	Items	Cronbach Alpha
Credibility	14	0.84
Identification	6	0.77
Attitude towards Ad.	4	0.74
Attitude towards Br.	5	0.81
Purchase Intentions	3	0.79
Endorser Type	8	0.75

Hence, the results support the reliability of the identified factors.

Discussion

The purpose of this study was to test the reliability and validity instrument measuring the role of endorser's Credibility and Identification in advertisements by analysing the moderating effect of Celebrity versus Social Media Influencer on the mediating relationship of attitude towards advertisement and brand with purchase intentions of a customer.

In order to proceed by answering the research questions of this study, the instrument for data collection was formulated. The instrument was a self-administered questionnaire comprised of already validated scales taken from different studies. However, there was a need to test its reliability and validity because, all the scales were adapted and modified as per the requirement of this study. Major modification was applied to the scale of Credibility (Ohanian, 1990) - all the items were paraphrased from the original semantic differential scale with bi-polar adjectives. Another major adaptation was applied to the scale items for measuring the impact of Celebrity (Khan, 2017; O'Mahony & Meenaghan, 1997). Items were rephrased to measure the effect its counterpart – Social Media Influencer which operate in a totally different environment. Since, modifying the scale to measure Credibility and adapting a scale originally designed for celebrities to fit social media influencers involved significant changes in context and possibly in the underlying construct, hence, it was critical to ensure the validity and reliability of the instrument because "altering the wording of items, even slightly, can change the factor structure and the underlying constructs that the items are meant to measure. Therefore, it is essential to validate the modified scale to ensure it still accurately measures the intended constructs" (DeVellis & Thorpe, 2021). Given the reasons, the process initiated with content validity of the instrument. In content validity, professional subjective judgment is required to determine the extent to which the scale is designed to measure a trait of interest (Nunnally, 1978). Hence, for an accurate judgment, five subject-experts were consulted to judge the content domains of the scale (Burns, 1993). They provided feedback on how well it represented the topic at hand and whether or not it was appropriate. Recommendations given by them were taken into account and necessary changes were made. According to Sireci (1998) content validity is necessary but not sufficient and hence construct validity of the instrument was further conducted. Exploratory Factor Analysis (EFA) was carried out to gather information about the interrelationships among a set of variables (Pituch & Stevens, 2015). It is usually recommended to run an Exploratory Factor Analysis (EFA) on modified or adapted instruments because, "altering the wording of items, even slightly, can change the factor structure and the underlying constructs that the items are meant to measure. Therefore, it is essential to validate the modified scale to ensure it still accurately measures the intended constructs" (DeVellis & Thorpe, 2021).

A step by step approach was followed (Shrestha, 2021). First, for the assessment of suitability of data Sample size, Correlation Matrix, Kaiser-Meyer-Olkin (KMO) and Bartlett's test for Sphericity were determined. A sample of 100 was taken basing on the recommendations by Nunnally (1978) and Costello & Osborne (2005). To determine the suitability of data set for EFA, strength of relationship between observed variables was evaluated. According to Hair et al. (2010), the correlations among items should be >0.3 to warrant EFA. The correlation among most of the items was more than 0.3 which guaranteed the furthering of EFA. Next, KMO and Bartlet's

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test of Sphericity were carried out. The test computed KMO statistics at 0.69 which rendered the sample data suitable for the factor analysis. Bartlett's test of Sphericity was highly significant at $p < 0.00$ which is less than $p < 0.05$ (Bartlett, 1950). The test value showed that the correlation matrix had significant correlations among some of the variables hence, is not identity matrix (Bartlett, 1950; Shrestha, 2021).

The second step was Factor Extraction. In order to run the extraction, we followed the general procedure of conducting Principal Component Analysis, PCA (IBM, 2022). In order to determine the number of factors to be extracted, Kaiser's criterion or Eigenvalue criterion (Kaiser, 1960), Scree test (Cattell, 1966), and Cumulative Variance Extracted (Horn, 1965) were taken into account. All the 44 items were taken into account for the analysis. The analysis was run. PCA extracted 11 factors with recommended eigenvalues > 1 (Kaiser, 1974). However, this exceeded the theoretically expected 10 factor structure based on our literature review. In order to address this ambiguity, at first communalities were analyzed. PCA works on the assumption that all variance of variables is common (shared across all factors), rather than unique to a specific factor. After extraction, communalities are updated to reflect the actual variance in each variable explained by the retained factors. The closer the communality is to 1, the better the variable/item is explained by the factor structure, while a value closer to 0 suggests that the factor model does not explain much of that variable's variance (Hair et al., 2013). All the variables had communalities ranging from 0.57 to 0.92 except for EXPRT3 which had moderately low at 0.47 but acceptable (Hair et al., 2013). Next remedial action was to analyze Pattern Matrix (Osborne & Banjanovic, 2016).matrix revealed that items such as, EXPRT3 (Qualification of an endorser I follow, influences my purchase decision for a product/service), ATA4 (An advertisement endorsed by a famous endorser: is good), CELEB2 (I may switch from one product/service to another if it is advertised by my favorite celebrity) and SMI2 (I may switch from one product/service to another if it is advertised by my favorite social media influencer) were forming a new factor. The content of these items was examined to rule out the possibility of forming another construct which was however rejected because all these items measured different theorized constructs i.e. expertise of an endorser, attitude towards advertisement and the impact of endorser type. Items exhibiting complex behaviours such as grouping together despite measuring different or opposing concepts could be due to the issues like method variance (Podsakoff et al., 2012). This happens when items share some systematic variance (e.g., response styles) or items being poorly phrased or a problem with how the items were interpreted by respondents, leading to unexpected correlations between items to form unintended shared dimension. This usually requires a careful review of the items and potential revising or rewording them. Finally, after a careful review and revision from literature in total 4 items were deleted which reduced the number of total input items to 40 only. Since, EFA is an exploratory and iterative process (Osborne & Banjanovic, 2016) hence, the extraction was re-run which reproduced the expected/theorized 10-factor structure with eigen values > 1. In other words, 40 items measured 10 underlying factors. Other factors/components having low eigenvalues were not assumed to represent the data set and were dropped. All these factors accounted for more than 75.96% variance in data. It is massive because, the proportion of the total variance explained by retained factors should be at least 50% (Shrestha, 2021). Nevertheless, eigenvalues, like all other sample statistics are prone to sampling error therefore, another common method is the Scree test (Cattell, 1966). the inspection of scree plot revealed a 10-factor result because the bent/breakpoint occurred at 11th factor where eigenvalue drops from 1. The other factors having eigen values < 1 were not considered because they accounted for a small proportion of the variance consequently dropped from the analysis.

Third step was ensued by the rotation process. Pattern Matrix followed by Component Correlation Matrix was analyzed. The matrix confirmed the 10-factor structure. Items showed strong factor loadings >0.5 (Tabachnick et al., 2013) grouped together under their respective factors. Component Correlation Matrix showed moderately strong to weak positive correlations among all the components.

The strongest correlation existed between Component 1 (TRUST), 3 (ATTRACT), and 6 (EXPRT). Their clustering suggested of forming a potential higher-order construct of Credibility. Another stronger correlation was shown between Component 8 (WIDEN) and Component 9 (PSIMI) followed by components 5 (CELEB) and component 7 (SMI) also signifying a formation of possible higher-order construct associated to Identification and Endorser Type respectively. Component 1 (TRUST), 3 (ATTRACT), and 6 (Expertise) also showed moderate correlations component 2 (ATB) and component 4 (ATA). These correlations indicate that as trustworthiness, attractiveness, and expertise increase, there's a tendency for ATB and ATA to increase as well, and vice versa. Similarly, but to a lesser extent, as the tendency towards Wishful Identification and Perceived Similarity increase, there's also a slight tendency for ATB and ATA to increase. Moreover, components 2 (ATB) and 4 (ATA) also showed a moderated correlation with component 10 (PI) which indicates their positive influence on Purchase Intentions. Last, the matrix also showed that Component 5 (CELEB) and 7 (SMI) also weakly but positively correlate with component 2 (ATB), Component 4 (ATA) and Component 10 (PI). This suggests that both the celebrity and social media influencer influences the attitudes towards forming purchase intentions.

Hence, the component correlation matrix effectively identified the distinct nature of each component, supporting the hypothesized relationships within the theoretical framework of this study. It also confirmed the presence of higher-order constructs, aligning with the theoretical expectations, thus validating the overall structure of the model.

Once the validity of instrument was determined the last and final step was to test the reliability of this instrument. This was done using Cronbach's alpha (Cronbach, 1951). The results showed satisfactory reliability scores for all factors, confirming that the instrument is dependable for capturing the constructs as theorized. The high reliability also supported the validity and consistency of the instrument in the context of the study.

In conclusion, the study successfully tested the validity and reliability of the adapted instrument through rigorous analysis, including Exploratory Factor Analysis (EFA), Principal Component Analysis (PCA), and oblique rotation using Promax. The results confirmed the hypothesized factor structure, demonstrating that the adapted instrument is both valid and reliable for measuring the intended constructs.

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